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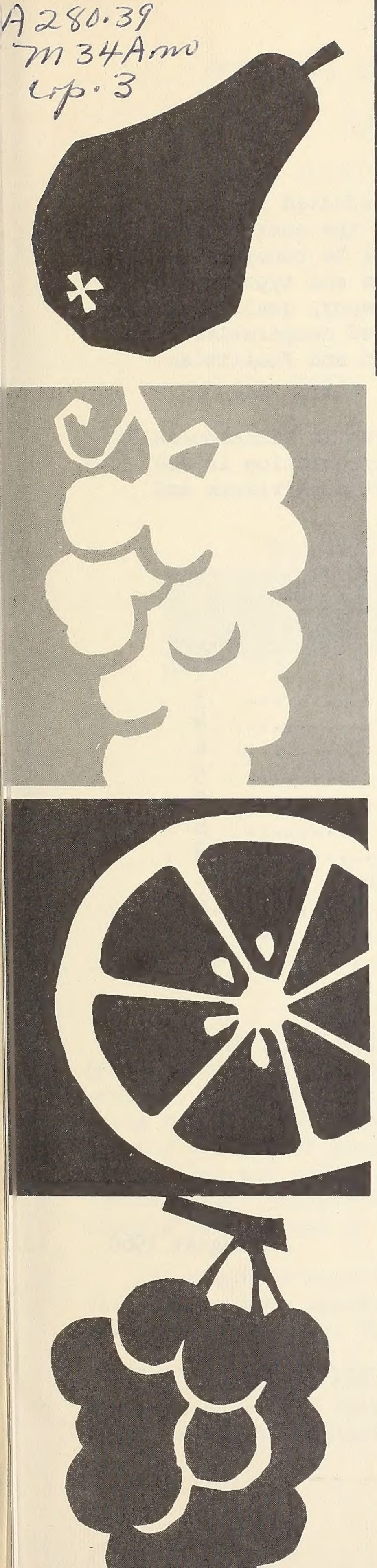

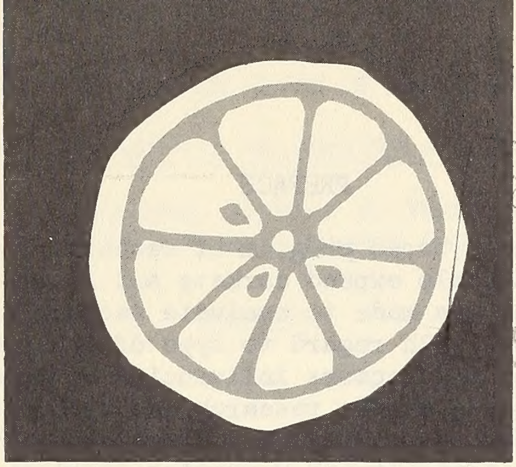

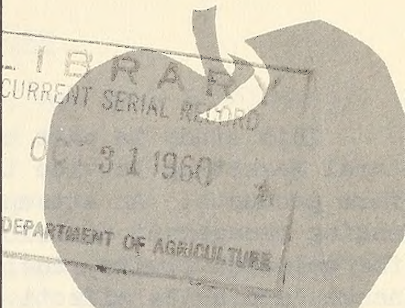

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Displaying Fruit in Various Types of Packages and in Bulk

...COSTS AND EFFECTS ON QUALITY AND SALES

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL MARKETING SERVICE

MARKET DEVELOPMENT RESEARCH DIVISION

PREFACE

This study is part of a broad program of research conducted by the Agricultural Marketing Service to help expand markets and reduce the cost of marketing farm products. An attempt was made to evaluate factors to be considered in making management decisions with regard to type of package and type of display for selected fruits, including factors influencing efficiency, quality maintenance, and sales effectiveness. The research was conducted cooperatively by the Market Development, Market Quality, and Transportation and Facilities Research Divisions of the Agricultural Marketing Service.

The Red Owl Stores, Inc., made available retail stores in Minneapolis-St. Paul, Minn., for this merchandising research. Special appreciation is due Mr. Alvin L. Nordstrom, Mr. James Willie, and the district supervisors and store managers of the Red Owl organization.

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Washington, D. C. August 1960

DISPLAYING FRUIT IN VARIOUS TYPES OF PACKAGES AND IN BULK

Costs and Effects on Quality and Sales

By Nick Havas, Peter L. Henderson, Chester S. Parsons, and Paul Schaffer [1]
Agricultural Marketing Service

SUMMARY

A merchandising test showed that 18 percent more grapes were sold when the grapes were displayed in home "toter" bags (open-top paper bags with handles) than when they were displayed in overwrapped trays. The bags cost less than the overwrapped trays, and the grapes kept better in the bags than in the trays. But the quantity used as the pricing unit ($1\frac{1}{2}$ pounds for 31 cents) did not fill the bags, and shoppers sometimes filled them with grapes from other packages. If the home toter bags are to be used successfully, retailers should choose sizes that will hold only the volume desired for a selected pricing unit.

Sleevewrapped and overwrapped trays were equally effective for selling pears, but the cost of packaging in the sleevewrapped trays was lower. When displayed on nonrefrigerated cases, pears in the overwrapped trays showed less scald than those in sleevewrapped trays.

Apples and oranges of premium quality and size were displayed in sleevewrapped trays, overwrapped trays, open trays, polyethylene bags, and in bulk. Total sales were about the same whether the fruit was displayed in packages only or in both packages and bulk.

Costs of direct labor and materials for packaging apples and oranges of premium quality and size were about 1 cent less for the polyethylene bags and 0.8 cent less for the sleevewrapped trays than for the overwrapped trays; the overwrapped trays cost about 4.4 cents each. The open trays cost about the same as the sleevewrapped tray, but fruit in open trays was handled excessively by customers and additional time was required at the checkout counter to repack the fruit. Type of package did not affect the keeping quality of apples and oranges when displayed under refrigeration.

Sales of medium-size oranges were significantly greater when part or all of the oranges displayed were prepackaged (in polyethylene bags) than when they were all displayed in bulk. There was little difference in labor and material costs for merchandising the medium-size oranges in packages or in bulk. The keeping quality of prepackaged and bulk fruit was about the same, except that weight loss and softening were greater in the bulk displays. These findings indicate that retailers can expect greater returns by displaying medium-size oranges prepackaged or in combination with bulk rather than all in bulk.

As might be expected, weight loss in all test fruit was generally greater, visible decay in apples and pears more frequent, and the percentage of soft oranges higher, when the fruit was displayed without refrigeration.

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[1] Mr. Havas and Mr. Henderson were responsible for the retail sales test; Mr. Parsons was in charge of the quality maintenance test; and Mr. Schaffer was responsible for evaluating the direct labor and materials test.

Differences in sales of grapefruit in this experiment were not statistically significant whether displays were of packaged fruit, bulk fruit, or combinations of package and bulk.

The merchandising test was conducted in nine food supermarkets in Minneapolis-St. Paul, Minn., in October-December 1958. The purpose of the test was to compare the effect of the different types of packages and displays on sales, costs, and keeping quality.

INTRODUCTION

The produce department of a modern food supermarket accounts for approximately 10 percent of gross sales and is the second most important department among the perishables.

Except for produce, most foods are sold in prepackaged form on a self-service basis. Members of the trade estimate that only 55 percent of produce items are offered self-service either through package displays or unit pricing of the item itself (melons, grapefruit, etc.) 2/ Many stores offer bulk as well as prepackaged displays of many items. Some offer bulk only and some prepackaged only.

Research indicates that packaged produce has certain advantages for retail store operators. Packages protect the produce, preserve its quality, and reduce waste; displays can be stocked more efficiently; and customers move more rapidly through the produce department. In considering the use of packaging, the retailer must decide whether these advantages outweigh the cost of packaging materials, and the cost of removing unsalable items from packages and repackaging the salable merchandise; he must make sure that the types and sizes of packages and the packaging materials are acceptable to customers.

In a series of controlled experiments by Messrs. Henderson and Dominick, significant increases in the sales of McIntosh apples were observed when they were displayed in 4-pound polyethylene bags instead of 4-pound cellophane bags. 3/ The findings also showed that adding bulk apples to displays containing packages did not materially affect sales when the packages held 5 pounds or less; but for apple displays containing 6-, 8-, and 10-pound packages, the addition of bulk fruit was necessary for the customers desiring smaller amounts.

OBJECTIVES

Objectives of the study were to assist the fruit industry (packers, shippers, distributors, and retailers) in making decisions relative to merchandising

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2/ Moore, James B. Big Brands Coming in Produce. Food Business, 7 (6):13. June 1959.

3/ Dominick, Bennett A. Merchandising McIntosh Apples in Retail Stores. Cornell University Agr. Expt. Sta. Bul. 895, Ithaca, New York, May 1953.

Henderson, Peter L. Influence of Selected Marketing Service on Apple Sales. Unpublished Ph. D. Thesis, Cornell University, 1952.

fresh fruit more efficiently by providing information on (1) the effect of selected types of packages and displays on retail sales of grapes and pears, apples and oranges of premium quality and size, medium-size oranges, and grapefruit; (2) the comparative costs of labor and packaging materials for the different types of packages and displays; and (3) the relative effectiveness of the selected types of packages and displays in maintaining quality of the packaged products.

PROCEDURE

Research pertaining to sales effectiveness of the packages and displays was conducted through controlled experiments in selected retail supermarkets operated by a corporate chain in Minneapolis-St. Paul, Minn. 4/ Merchandising practices used by the stores, such as prices, allocation of space, and location of displays, were either held constant or changed simultaneously and to the same degree in all test stores.

Grapes in the displays tested were packaged (1) in cellophane overwrapped trays (1½ pounds) and (2) in handle-type (or home toter) open bags (1½ pounds). For pears, the sales effectiveness of cellophane overwrapped trays was compared with that of cellophane sleevewrapped trays. Each package contained six pears.

A switch back experimental design, using eight stores and two replications over time, was used to test the consumer acceptance of selected packages for grapes and pears. (See appendix, tables 3 and 4, for outline of experimental design.)

The latin square experimental design, using six stores and six time periods (1 week each), was used to test the acceptance of four types of packages and two types of displays for premium quality apples (Red Delicious, Golden Delicious, and Winesap varieties, sizes 125 to 88, and premium quality California oranges, size 88. (See appendix, table 5, for experimental design.) Four types of packages and two types of displays were tested in this experiment. The fruit used to test these six merchandising methods were priced in units of six and were displayed as follows:

1. Cellophane sleevewrapped trays (no bulk fruit)
2. Cellophane overwrapped trays (no bulk fruit)
3. Cellophane sleevewrapped trays and bulk fruit
4. Cellophane overwrapped trays and bulk fruit
5. Open trays (no wrapping material or holding tape) and bulk fruit
6. Polyethylene bags and bulk fruit

Methods 1 and 2 were compared with methods 3 and 4 (same type of packages) to obtain the relative sales effectiveness of displays of packaged fruit and displays combining packaged and bulk fruit. Comparisons were also made among methods 3, 4, 5, and 6 and between methods 1 and 2.

The latin square design was also used to test the sales effectiveness of various types of displays for medium-size oranges and size 96 Florida grapefruit. The displays tested consisted of (1) all fruit packaged in polyethylene

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4/ The produce departments of the sample stores were 100 percent self-service.

bags, (2) all fruit in bulk, and (3) combination of packaged (polyethylene bags) and bulk fruit. Oranges were packaged and priced in units of 12 and grapefruit in units of 6. The test was conducted in nine stores during three time periods of 1 week each. Each type of display was offered in three stores each week and was rotated weekly so that it would be offered in each store 1 week during the test. The experimental design is shown in the appendix, table 6.

Sales data for the displays tested in the experiments described above were obtained by audits of store records. Supplemental data on produce sales and customer count were obtained from the chain headquarters. The supplemental data were used as a basis for adjusting sales data if the number of customers patronizing the stores or other outside influences affecting store sales, such as factory or office pay periods, did not follow the same pattern each week for all stores.

Experimental designs and procedures used in these tests provide a basis for estimating the reliability of the data or the probability of obtaining similar results in repeated tests.

Repeated time and motion studies were made in retail stores to determine the labor costs for packaging, pricing, and displaying the fruit using each type of package and display included in the test. The costs of packaging materials for all test items were also obtained.

Quality control tests under simulated retail conditions were conducted at Beltsville, Md., to evaluate the efficiency of the packaging materials and displays in maintaining the quality of the fruits used in the merchandising tests. A mechanically refrigerated produce display cabinet and two nonrefrigerated produce display racks were used in the quality control tests (appendix, figs. 1 and 2).

FINDINGS

Packages for Grapes

Sales of grapes in home toter bags were 18 percent greater than sales in overwrapped trays. It was observed, however, that some of the customers who bought grapes in home toter bags supplemented their purchases with grapes from other packages. This resulted in an estimated 4 percent shrinkage or loss to the store and was due partly to incomplete filling of the bags. Thus, completely filling the bags when weighing and pricing them would reduce losses. But, even after allowing for the loss, the sales difference in favor of the home toter bag was found to be statistically significant at the 20 percent probability level--that is, in 8 out of 10 repeated tests under similar conditions, sales of grapes in home toter bags could be expected to be greater than sales in overwrapped trays. The following tabulation shows the average number of $1\frac{1}{2}$-pound packages of grapes sold per store:

Type of package	Average weekly sales per store 1/
	Packages
Cellophane overwrapped trays	215
Home toter bags	2/ 254

1/ Adjusted for differences in number of customers patronizing stores during the experimental weeks and the loss due to shrinkage.
2/ Increase in sales significant at 20 percent probability level.

Costs for labor and packaging materials for the home toter bag were approximately one-half cent less than costs for the cello overwrapped tray (appendix, table 7). Therefore, both in sales and in economy the home toter bag seems to be more advantageous for grapes than the overwrapped tray. The additional sales and reduced cost, however, should be weighed against the loss of net profit from shrinkage. With the prices and markups used during the test, the net margin realized from grapes sold in home toters was only $1 more than for grapes sold in trays, although gross sales using home toters exceeded grape sales in trays by nearly $13, as shown below:

Cellophane overwrapped trays:		
Gross sales of 215 packages @ 31½ cents a package		$67.73
Costs for 215 packages:		
Labor and materials @ 4.47 cents a package	$ 9.61	
Grapes @ 21 cents a package	45.15	
Total direct costs		54.76
Net margin over direct costs		12.97
Home toter bags:		
Gross sales on 254 bags @ 31½ cents a bag 1/		80.01
Costs for 265 bags: 2/		
Labor and materials @ 3.92 cents a bag	10.39	
Grapes @ 21 cents a bag	55.65	
Total direct costs		66.04
Net margin over direct costs		13.97

1/ Number of packages sold after adjustment for losses.
2/ Number of packages placed on display for sales of 254 packages, assuming a 4 percent loss.

Findings of the quality control test showed that grapes in the tray overwrapped with perforated cellophane lost less weight and shriveled less than those in home toter bags; however, the fruit decayed more in the overwrapped tray. This test indicated that the two packages were about equal in salability rating for grapes (appendix, tables 10, 11, and 15).

Packages for Pears

Sales differences between displays of pears in sleevewrapped and overwrapped packages were negligible, as shown in the tabulation below. Statistical tests showed that in repeated tests results may favor either of the two packages about an equal number of times.

Type of package	Average weekly sales per store 1/
	Packages 2/
Cellophane sleevewrapped trays.......	3/ 358
Cellophane overwrapped trays.........	3/ 350

1/ Adjusted for differences in number of customers patronizing stores during the test.
2/ Each package contained 6 pears of same size.
3/ Difference in sales not statistically significant.

Results of the quality control test showed that when pears were displayed on refrigerated cases they remained in good condition and were salable in both types of package for 7 days (appendix, table 15). A higher percentage of pears packed in the sleevewrapped trays showed scald, but the percentage of pears affected by scald was not sufficient to affect materially the salability rating of pears in either package (appendix, fig. 3).

When displayed on the nonrefrigerated case, pears packaged in the sleevewrapped trays required sorting and repacking after only 4 days and were practically unsalable after 7 days. On the other hand, pears packaged in overwrapped trays remained salable for 7 days before it was necessary to sort and repack. Approximately 75 percent of the pears packaged in the sleevewrapped trays and 40 percent of those packed in overwrapped trays were affected by scald (appendix, table 12).

Labor and materials for the cellophane overwrapped 6-pear tray cost 4.37 cents, compared to 3.60 cents for the sleevewrapped tray (appendix, table 8).

Thus, since the two types of package are equal in sales effectiveness it would be advantageous to retailers to use the sleevewrapped trays when pears are displayed on refrigerated cases and are sold within 7 days. If nonrefrigerated cases are used for displays and pears are not sold within 4 days, the greater losses from deterioration of the fruit packaged in sleevewrapped trays will be more than the savings in labor and material cost.

Packages and Displays for Apples and Oranges of Premium Quality and Size

Differences of approximately 23 percent in average weekly sales were observed between some of the test methods for premium quality and size of apples and oranges (table 1). But these differences were not statistically significant at any probability level that would be acceptable for making management decisions. That is, if repeated tests were conducted, it could be expected that each method would be first in sales about an equal number of times. Furthermore, the data show that trays, sleevewrapped or overwrapped, are relatively as efficient in producing sales when displayed alone as when displayed in combination with bulk. These interrelationships indicate the likelihood that there would be no difference in sales effectiveness among the four types of packages tested whether they were displayed with or without bulk fruit.

Table 1.--Average weekly sales per store of premium-size apples and California oranges for selected types of package materials and types of displays in six supermarkets, Minneapolis-St. Paul, Minn., November-December 1958

Type of display and package	Apples	Oranges
	Number of fruit	Number of fruit
100 percent packaged displays:		
Cellophane sleevewrapped trays.......	1,936	294
Cellophane overwrapped trays.........	1,588	364
Combination package-bulk displays:		
Cellophane sleevewrapped trays.......	1,958	372
Cellophane overwrapped trays.........	1,732	377
Open trays (fruit loose in trays)....	1,960	356
Polyethylene bags....................	1,814	391

Because the difference in sales among the methods tested did not favor any single method, cost and quality maintenance should be the primary considerations in evaluating the relative merits of each package and display tested.

The open-tray method was not further evaluated because it is more of a display technique than a method of wrapping. In a sense, the wrapping function is shifted from the backroom to the checkout counter where the merchandise in the trays is dumped into kraft bags. Although the open-tray package utilizes the merchandise, it does not protect the fruit, and indirectly it encourages customers to handle the produce to obtain the most desirable package.

Of the three principal methods of packaging oranges and apples, the 6-pack in a poly bag cost the least in labor and materials. Direct costs for labor and materials were 3.4 cents for poly bags, compared to 3.6 cents for the cello sleevewrapped package, the next lowest cost package (appendix, table 8).

Quality comparisons for individual factors showed some variations between the packages and bulk fruit and between refrigerated and nonrefrigerated displays (appendix, tables 10, 13, and 14). These variations tended to counteract each other, as shown by salability rating (appendix, table 15). Generally, the maintenance of quality of apples and oranges was about equal for all packages tested and was no better for the refrigerated display than for the nonrefrigerated display when held for only 7 days. The salability of fruit displayed in bulk was also approximately equal to the fruit displayed in packages; however, it is improbable that similar results for bulk fruit would be obtained in actual practice because fruit in bulk displays is handled by customers.

Displays for Grapefruit and Medium-Size Oranges

Grapefruit

Sales of grapefruit varied considerably among the three methods tested, but differences were not statistically significant (table 2).

Table 2.--Average weekly grapefruit sales per store for selected types of displays in six supermarkets, Minneapolis-St. Paul, Minn., October-November 1958

Type of display 1/	Store group 2/ I	Store group 2/ II	Average
	Number of units	Number of units	Number of units
100 percent packaged......	220	219	219
100 percent bulk..........	223	153	188
Combination package and bulk................	310	216	263

1/ Polyethylene bags containing 6 grapefruit used in 100 percent packaged and combination displays with the fruit priced in units of 6.

2/ Three stores in each group.

The fact that the rather large differences in sales among test methods were not statistically significant means that the variation in sales within each of the methods equaled or exceeded the differences among the three methods. This variation in sales within test methods is evident in the group totals. It may be noted in table 2 that sales in group I favored the combination display by a wide margin. In group II, sales were higher when fruit was displayed in packages than when it was displayed either in combination or bulk alone. Because of this inconsistency in sales, exemplified by the wide variation in sales within test methods in some stores, it is not possible to conclude from the findings of this experiment which of the three display types would maximize grapefruit sales.

Oranges

Sales of medium-size oranges were approximately 50 percent greater when offered in displays of packaged fruit or in combination package and bulk displays than when offered in bulk displays, as shown in the tabulation below.

Type of display 1/	Sales
	Number of units
100 percent packaged in polyethylene bags	2/ 657
100 percent bulk	426
Combination packaged (polyethylene bags) and bulk	2/ 636

1/ Oranges priced and packaged in units of 1 dozen.

2/ Sales from displays containing packaged oranges were different from sales from bulk display at 1 percent significance level, but no significant difference in sales was found between the 100 percent packaged and the combination displays.

Differences in sales between displays containing packages (all fruit in packages and combination package and bulk) and the all bulk display were found to be statistically significant at the 1 percent probability level. The difference in sales between the display of packaged fruit and the combination package and bulk display was not statistically significant and may have been due to chance variation.

Direct costs for labor and materials were slightly higher (0.2 cent per package) for prepackaged oranges than for bulk oranges (appendix, table 9).

For packaged grapefruit, however, the direct costs for labor and material were slightly lower (0.12 cent per package or unit of 6) than for grapefruit in bulk (appendix, table 9). Merchandising prepackaged grapefruit was found to be less costly than selling grapefruit in bulk, because the additional time incurred in handling the bulk fruit when placing them on display and at the checkout exceeded the added cost of the packaging material and backroom preparation for the prepackaged fruit.

Thus, considering costs and sales results, it would be advantageous to retailers to offer grapefruit and oranges in 100 percent packaged displays or combination package and bulk displays, rather than bulk alone.

APPENDIX

Table 3.--Experimental design for testing the effect of packages on sales of grapes in eight supermarkets, Minneapolis, Minn., 1958

Week	Store							
	1	2	3	4	5	6	7	8
First replication								
1. 10/27 - 11/1	O.W	O.W	F	F	O.W	F	F	O.W
2. 11/3 - 11/8	F	F	O.W	O.W	F	O.W	O.W	F
Second replication								
3. 11/10 - 11/15	O.W	F	O.W	O.W	O.W	F	F	F
4. 11/17 - 11/22	F	O.W	F	F	F	O.W	O.W	O.W

Treatment code: O.W - Overwrapped tray displays
F - Home toter bags

Table 4.--Experimental design for testing the effect of packages on sales of pears in eight supermarkets, Minneapolis, Minn., 1958

Week	Store							
	1	2	3	4	5	6	7	8
First replication								
1. 10/27 - 11/1	S.W	O.W	S.W	O.W	S.W	O.W	O.W	S.W
2. 11/3 - 11/18	O.W	S.W	O.W	S.W	O.W	S.W	S.W	O.W
Second replication								
3. 11/10 - 11/15	O.W	S.W	O.W	S.W	O.W	S.W	S.W	O.W
4. 11/17 - 11/22	S.W	O.W	S.W	O.W	S.W	O.W	O.W	S.W

Treatment code: O.W - Overwrapped trays
S.W - Sleevewrapped trays

Table 5.--Experimental design for testing the effect of packages on sales of apples and oranges of premium quality and size in six supermarkets, Minneapolis-St. Paul, Minn., 1958

Week	Store					
	1	2	3	4	5	6
1. 11/3 - 11/8	*O.W	O.T	POLY	O.W	*S.W	S.W
2. 11/10 - 11/15 1/	O.T	O.W	S.W	*O.W	POLY	*S.W
3. 11/17 - 11/22	*S.W	POLY	*O.W	S.W	O.W	O.T
4. 11/24 - 11/29	POLY	S.W	O.T	*S.W	*O.W	O.W
5. 12/1 - 12/6	O.W	*O.W	*S.W	O.T	S.W	POLY
6. 12/8 - 12/13	S.W	*S.W	O.W	POLY	O.T	*O.W

Treatment code: (Type of display)

S.W - Sleevewrapped trays and bulk	*S.W - Sleevewrapped trays, no bulk
O.W - Overwrapped trays and bulk	*O.W - Overwrapped trays, no bulk
O.T - Open trays and bulk	POLY - Polyethylene bags and bulk

1/ The same design was used for apples and oranges.

Table 6.--Experimental design for testing effect of various types of displays on sales of grapefruit and medium-size oranges in nine supermarkets, Minneapolis, St. Paul, Minn., 1958 1/

Group	Store	Test week		
		December 1-6	December 8-13	December 15-20
I	1	P	B	P&B
	2	B	P&B	P
	3	P&B	P	B
II	4	P	P&B	B
	5	B	P	P&B
	6	P&B	B	P
III	7	P	B	P&B
	8	B	P&B	P
	9	P&B	P	B

Code of merchandising methods:

P - All test fruit displayed in poly bags, 1 dozen oranges per bag and 6 grapefruit per bag.

B - All test fruit in bulk. Oranges priced in units of 1 dozen, grapefruits in units of 6.

P&B - Combination display of prepackaged (poly bags) and bulk fruit (50 percent of display area devoted to each). Oranges packaged and priced in units of 1 dozen, grapefruit in units of 6.

1/ The test grapefruit was size 96, and the oranges were sizes 138 and 163 for California fruit and size 252 for Florida fruit.

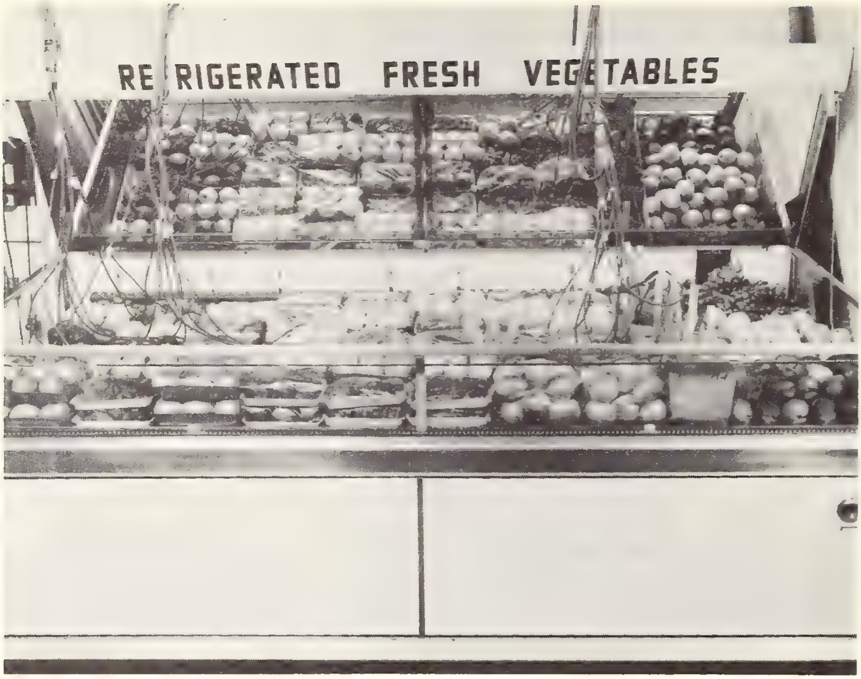

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Figure 1.--Refrigerated display case used in tests, showing packaged and bulk fruit and thermocouple leads in place for recording temperature of fruit.

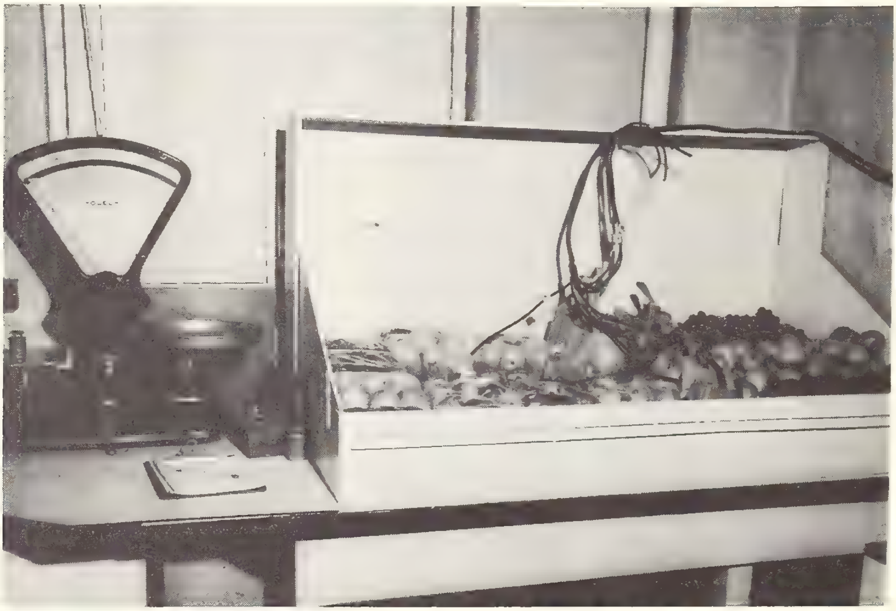

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Figure 2.--One of two nonrefrigerated display cases used in tests, showing packaged and bulk fruit and thermocouple leads in place for recording temperature of fruit.

Table 7.--Time required and costs for labor and material per package, for packaging and displaying grapes in cellophane overwrap trays and home toter bags

Labor and materials	Cellophane overwrap tray		Home toter bag	
	Time	Cost	Time	Cost
	Minutes	Cents	Minutes	Cents
Labor:				
Fill package	0.212	---	0.271	---
Wrap 1/	.388	---	---	---
Miscellaneous wrap	.042	---	.031	---
Feed packaging line	.039	---	.039	---
Flat handling	.008	---	.153	---
Weigh and price	.130	---	.159	---
Miscellaneous weigh	.033	---	.041	---
Display	.090	---	.104	---
Total	.942	---	.798	---
15 percent allowance	.141	---	.120	---
Total	1.083	3.25	.918	2.75
Materials:				
Cellophane, 13"x14"	---	.53	---	---
No. 1½ or No. 2 tray	---	.64	---	---
Toter bag	---	---	---	1.12
Label	---	.05	---	.05
Total materials	---	1.22	---	1.17
Total labor and materials	1.083	4.47	.918	3.92

1/ Includes getting tray and cello as well as putting the packed tray aside.

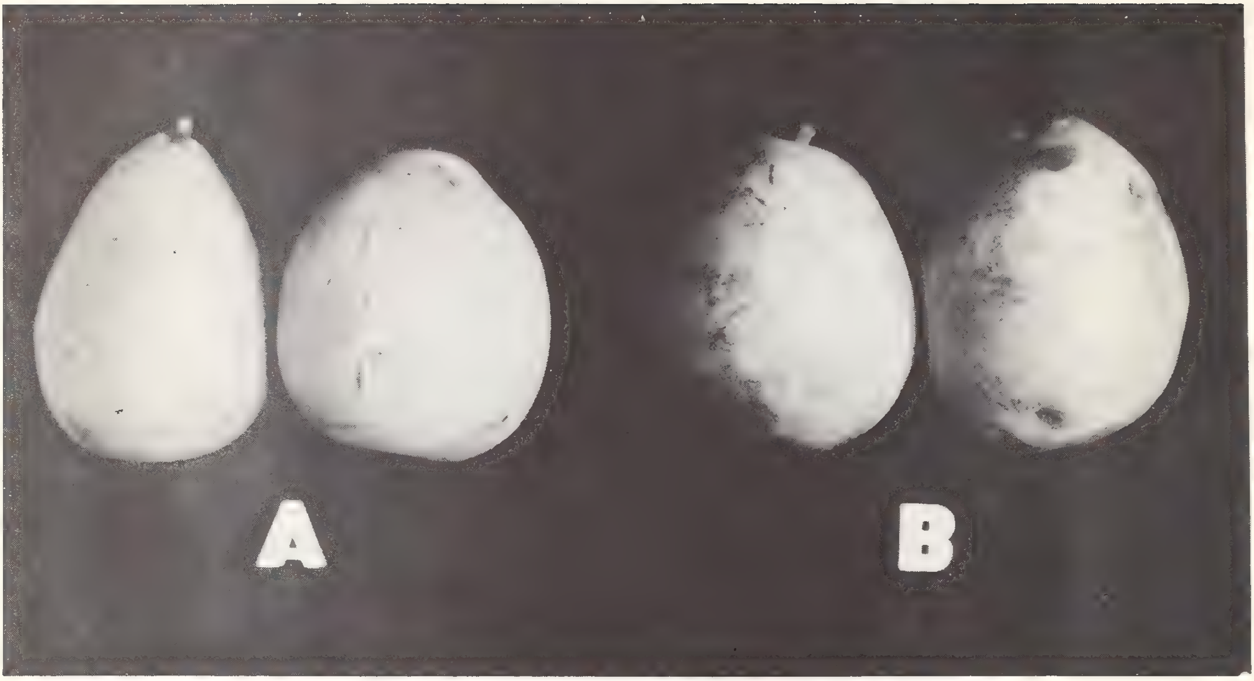

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Figure 3.--Scald of pears displayed 4 days in refrigerated (A) and nonrefrigerated (B) cases in sleevewrapped trays.

Table 8.--Time required and costs for labor and material, per package, for packaging 6-pack apples, oranges, and pears in 3 types of packages 1/

Labor and materials	Cellophane overwrap tray		Cellophane sleeve-wrap tray		Polyethylene bag	
	Time	Cost	Time	Cost	Time	Cost
	Minutes	Cents	Minutes	Cents	Minutes	Cents
Labor:						
Fill tray	0.172	---	0.172	---	---	---
Fill and close bag	---	---	---	---	0.282	---
Wrap package	.367	---	.198	---	---	---
Miscellaneous wrap elements	.042	---	.038	---	.032	---
Feed packaging line	.039	---	.039	---	.039	---
Packaging flat handling	.008	---	.008	---	.008	---
Weigh and price	.130	---	.130	---	.212	---
Weigh, irregular element	.033	---	.033	---	.023	---
Display (putting in selling area)	.090	---	.090	---	.090	---
Total	.881	---	.708	---	.686	---
15 percent allowance	.132	---	.106	---	.103	---
Total	1.013	2/ 3.03	.814	2/ 2.44	.789	2/ 2.37
Materials:						
Cellophane	---	3/ .62	---	4/ .44	---	---
No. 2 tray	---	.67	---	.67	---	---
Polyethylene bags	---	---	---	---	---	5/ .75
Label	---	.05	---	.05	---	.14
Total	---	1.34	---	1.16	---	1.03
Total labor and material per package	1.013	4.37	.814	3.60	.789	3.40

1/ Cost for pears in cellophane overwrap and sleevewrap packages only.
2/ Labor @ $1.80 per hour.
3/ 13" x 14" LSAT second quality cellophane film.
4/ 8" x 16" LSAT second quality cellophane film.
5/ 5" x 3½" x 14" polyethylene film (poly) bags.

NOTE: LSAT is a code used by some manufacturers who designate that the cellophane film is partially moisture protected, water resistant for wet or moist products and heat sealable.

Table 9.--Time required and cost of labor and material, per unit, for packaging and displaying 1 dozen oranges and 6 grapefruit in polyethylene bags and in bulk

Labor and materials	Bulk displays				Packaged			
	Oranges		Grapefruit		Oranges		Grapefruit	
	Time	Cost	Time	Cost	Time	Cost	Time	Cost
	Minutes	Cents	Minutes	Cents	Minutes	Cents	Minutes	Cents
Labor at 3 cents per minute:								
Pack in poly bags	---	---	---	---	0.324	0.97	0.318	0.95
Display 1/	0.372	1.12	0.454	1.36	.166	.50	.174	.52
Checkout 2/	.274	.82	.287	.86	---	---	---	---
Total	.646	1.94	.741	2.22	.490	1.47	.492	1.47
Materials:								
Bags 3/	---	.34	---	.47	---	.87	---	.96
Closure	---	---	---	---	---	.14	---	.14
Total	---	.34	---	.47	---	1.01	---	1.10
Grand Total	.646	2.28	.741	2.69	.490	2.48	.492	2.57

1/ Includes cost of coding fruit displayed in bulk.

2/ Time needed to package bulk fruit and an additional ring-up time of 0.50 minute.

3/ Kraft bags (sizes No. 8 for oranges and No. 12 for grapefruit) for bulk fruit and poly bags (6"x3½"x15" for oranges and 6"x3½"x17" for grapefruit) for prepackaged fruit.

Table 10.--Weight loss of apples, pears, oranges, and grapes in various packages and in bulk after 4 and 7 days in refrigerated and nonrefrigerated cases

Display method	Weight loss after--							
	4 days				7 days			
	Apples	Pears	Oranges	Grapes	Apples	Pears	Oranges	Grapes
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Refrigerated:								
Open tray	0.6	1.3	2.5	4.6	1.0	1.6	3.7	5.8
Sleevewrapped tray	.6	.9	1.6	3.0	1.0	1.5	2.3	4.8
Overwrapped tray	.3	.4	.6	1.0	.5	.8	1.2	1.6
Polyethylene bag	.3	.3	.5	2.1	.6	.6	.8	3.6
Home toter bag	---	---	---	3.2	---	---	---	5.2
Bulk	1.0	.8	2.3	3.5	2.4	2.8	5.7	6.0
Mean	.6	.8	1.5	2.9	1.1	1.4	2.7	4.5
Nonrefrigerated:								
Open tray	1.4	2.2	4.5	9.4	2.5	3.8	7.4	14.3
Sleevewrapped tray	1.4	1.9	2.7	5.0	2.6	3.3	4.6	8.0
Overwrapped tray	.8	1.2	2.1	2.4	1.9	2.6	3.4	5.2
Polyethylene bag	1/ .4	.4	.7	4.5	1.1	1.1	1.1	8.3
Home toter bag	---	---	---	6.2	---	---	---	11.3
Bulk	1.5	2.1	5.4	8.9	3.4	4.0	7.0	15.1
Mean	1.1	1.6	3.1	6.1	2.3	3.0	4.7	10.4

1/ Not significant at the 5 percent probability level.

Table 11.--Grapes: Percentage showing decay and percentage shriveled after being displayed 4 and 7 days in refrigerated and nonrefrigerated cases

Display method and package type	Decay		Shriveled	
	4 days	7 days	4 days	7 days
	Percent	Percent	Percent	Percent
Refrigerated:				
Open tray	4.4	5.8	7.4	30.8
Sleevewrapped tray	1.9	2.4	2.1	21.9
Overwrapped tray	8.0	4.6	1.3	13.1
Polyethylene bag	1.4	4.8	2.6	14.8
Home toter (totem) bag	1.0	2.2	7.7	14.6
Bulk	1.8	2.6	4.2	40.2
Mean	3.1	3.7	4.2	22.6
Nonrefrigerated:				
Open tray	7.9	5.0	9.8	52.2
Sleevewrapped tray	6.4	9.8	3.3	27.2
Overwrapped tray	13.0	21.9	3.3	12.7
Polyethylene bag	2.6	14.2	2.2	21.8
Home toter (totem) bag	5.2	4.2	6.6	35.0
Bulk	2.7	4.6	6.2	53.4
Mean	6.3	10.0	5.2	33.7

Table 12.--Pears: Percentages showing decay and scald after being displayed 4 and 7 days in various types of packages and in bulk in refrigerated and nonrefrigerated cases

Display method and package type	Decay		Scald	
	4 days	7 days	4 days	7 days
	Percent	Percent	Percent	Percent
Refrigerated:				
Open tray	3.0	18.2	3.0	10.6
Sleevewrapped tray	4.5	6.1	4.5	16.7
Overwrapped tray	7.6	6.1	3.0	6.1
Polyethylene bag	3.0	13.6	.0	7.6
Bulk	2.0	2.3	.0	.0
Nonrefrigerated:				
Open tray	15.2	25.8	19.7	40.9
Sleevewrapped tray	16.7	21.2	72.7	75.8
Overwrapped tray	10.6	22.7	36.4	39.4
Polyethylene bag	25.8	33.3	62.1	71.2
Bulk	12.1	25.0	61.6	67.0

Table 13.--Oranges: Percentage showing decay and percentage of soft fruit after being displayed 4 and 7 days in refrigerated and nonrefrigerated cases

Display method and package type	Decay		Soft fruit	
	4 days	7 days	4 days	7 days
	Percent	Percent	Percent	Percent
Refrigerated:				
Open tray	0.0	0.0	1.4	8.3
Sleevewrapped tray	.0	.0	.0	1.4
Overwrapped tray	1.4	.0	.0	.0
Polyethylene bag	.0	.0	.0	.0
Bulk	.0	2.1	.0	.0
Nonrefrigerated:				
Open tray	1.4	1.4	8.3	15.3
Sleevewrapped tray	1.4	1.4	1.4	5.6
Overwrapped tray	1.4	.0	.0	1.4
Polyethylene bag	2.8	1.4	.0	.0
Bulk	.0	1.4	3.0	29.2

Table 14.--Apples: Percentages showing decay and scald and percentage shriveled after being displayed 4 and 7 days in various types of packages and in bulk in refrigerated and nonrefrigerated cases

Display method and package type	Decay		Scald		Shriveled	
	4 days	7 days	4 days	7 days	4 days	7 days
	Percent	Percent	Percent	Percent	Percent	Percent
Refrigerated:						
Open tray	1.4	1.4	4.2	38.9	0.0	0.0
Sleevewrapped tray	.0	2.8	16.7	25.0	0.0	.0
Overwrapped tray	.0	.0	15.3	13.9	.0	.0
Polyethylene bag	.0	1.4	8.3	30.6	.0	.0
Bulk	1.0	.0	5.0	5.3	.0	.0
Nonrefrigerated:						
Open tray	1.4	.0	2.8	1.4	4.2	.0
Sleevewrapped tray	6.9	13.9	.0	1.4	4.2	.0
Overwrapped tray	4.2	8.3	.0	.0	4.2	.0
Polyethylene bag	4.2	12.5	.0	.0	.0	1.4
Bulk	2.0	1.8	.0	1.8	.0	.0

Table 15.--Salability rating of oranges, pears, apples, and grapes displayed in various packages and in bulk for 4 and 7 days in refrigerated and nonrefrigerated cases 1/

Display method and package type	Oranges		Pears		Apples		Grapes	
	4 days	7 days	4 days	7 days	4 days	7 days	4 days	7 days
Refrigerated:								
Open tray	1.0	1.3	1.2	2.0	1.2	1.8	1.6	2.6
Sleevewrapped tray	1.0	1.0	1.3	1.7	1.4	1.6	1.2	1.8
Overwrapped tray	1.0	1.0	1.4	1.4	1.4	1.4	1.5	1.7
Polyethylene bag	1.0	1.0	1.1	1.7	1.2	1.7	1.2	2.0
Home toter bag	---	---	---	---	---	---	1.0	2.0
Bulk	1.0	1.2	1.3	1.3	1.3	1.8	1.4	3.7
Nonrefrigerated:								
Open tray	1.2	1.5	2.2	2.8	1.2	1.0	2.8	3.9
Sleevewrapped tray	1.1	1.2	3.4	3.8	1.2	1.4	2.0	3.5
Overwrapped tray	1.0	1.0	2.5	3.0	1.3	1.0	1.6	3.7
Polyethylene bag	1.1	1.1	3.7	4.0	1.1	1.5	2.0	3.0
Home toter bag	---	---	---	---	---	---	1.8	3.2
Bulk	1.1	1.7	3.0	3.3	1.3	1.3	1.8	4.0

1/ Salability ratings:

1.0 - excellent condition with no apparent deterioration
2.0 - good condition, slight deterioration from loss of color, decay, shriveling, etc.; salable without repacking
3.0 - fair condition, moderate to severe deterioration, requiring sorting and repacking before sale
4.0 - poor condition, unsalable even with sorting and repacking

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